IOP Conference Series: Earth and Environmental Science 2018 vol.107 N1

Functional approach in estimation of cultural ecosystem services of recreational areas

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Abstract

© Published under licence by IOP Publishing Ltd. The article is devoted to the identification and analysis of cultural ecosystem services of recreational areas from the different forest plant functional groups in the suburbs of Kazan. The study explored two cultural ecosystem services supplied by forest plants by linking these services to different plant functional traits. Information on the functional traits of 76 plants occurring in the forest ecosystems of the investigated area was collected from reference books on the biological characteristics of plant species. Analysis of these species and traits with the Ward clustering method yielded four functional groups with different potentials for delivering ecosystem services. The results show that the contribution of species diversity to services can be characterized through the functional traits of plants. This proves that there is a stable relationship between biodiversity and the quality and quantity of ecosystem services. The proposed method can be extended to other types of services (regulating and supporting). The analysis can be used in the socio-economic assessment of natural ecosystems for recreation and other uses.

http://dx.doi.org/10.1088/1755-1315/107/1/012091

References

[1] Millennium Ecosystem Assessment 2005 Ecosystems and human wellbeing: a framework for assessment (Washington, DC: Island Press)
[2] Daily G 1997 Nature's services: societal dependence on natural ecosystems (Washington, DC: Island Press)
[3] Costanza R et al 1997 Nature 387 253-260
[4] Daily G C et al 2009 Front Ecol Environ 7 21-28
[5] Daily G C et al 2000 Science 289 395-396
[6] Rudolf de Groot P S et al 2005 Ecosystems and Human Well-Being: Current State and Trends: Findings of the Condition and Trends Working Group 1 ed R Hassan et al (Washington, DC: Island Press) 455
[7] Egoh B et al 2007 Ecol. Econ. 63 714-721
[8] Chan K M et al 2012 Bioscience 62 744-756
[9] Cisneros-Montemayor A M and Sumaila U R 2010 J. Bioecon. 12 245-268
[10] Grêt-Regamey A et al 2008 J. Environ. Manage 89 197-208
[11] Daniel T C et al 2012 P. Natl. A. Sci. USA 109 8812-19
[12] Kremen C and Ostfeld R S 2005 Front. Ecol. Environ. 3 540-548
[13] Díaz S et al 2007 P. Natl. A. Sci. USA 104 20684-89
[14] Suding K N et al 2008 Glob. Chang. Biol. 14 1125-40
[15] Luck G W et al 2009 Bioscience 59 223-235
[16] Bengtsson J 1998 Appl. Soil. Ecol. 10 191-199

[17] Grime J P 2001 Plant Strategies, vegetation processes, and ecosystem properties (Hoboken, New Jersey, USA: Wiley)
[18] Eviner V T and Chapin F S 2003 Annu. Rev. Ecol. Evol. Syst. 34 455-485
[19] Hooper D U et al 2005 Ecol. Monogr. 75 3-35
[20] Kremen C et al 2007 Ecol. Lett. 10 299-314
[21] Wardle D A et al 2004 Science 304 1629-33
[22] Boyero L et al 2007 Ecol. Res. 22 551-558
[23] Lavorel S and Garnier E 2002 Funct. Ecol. 16 545-556
[24] Díaz S et al 2004 J. Veg. Sci. 15 295-304
[25] Petchey O L and Gaston K J 2006 Ecol. Lett. 9 741-758
[26] Yushkevich M V 2015 Proc. BSTU 1 111-114
[27] García-Llorente M et al 2011 Ecol. Appl. 21 3083-103
[28] de Bello F et al 2010 Biodivers. Conserv. 19 2873-93
[29] Lavorel S and Grigulis K 2012 J. Ecol. 100 128-140
[30] Garnier E et al 2016 Plant functional diversity: Organism traits, community structure, and ecosystem properties (Oxford, UK: Oxford University Press)
[31] Perez-Harguindeguy N et al 2013 Aust. J. Bot. 61 167-234
[32] Cornelissen J H C et al 2003 Aust. J. Bot. 51 335-380
[33] Murtagh F and Legendre P 2014 J. Classif. 31 274-295